

# CUBESATS

## CUBESAT OVERVIEW

- CubeSats, typically weighing between one and five kilograms, are nano-satellites developed, launched, and controlled at a fraction of the cost of a typical operating platform. They are beneficial in reducing the risk of larger programs because of their low cost and rapid development cycle.
- The NRO, NASA, and other government agencies recognize the utility of CubeSats and engage universities, service academies, laboratories, and industry to advance the state of practice.
- Historically used for technology demonstration and pathfinding, CubeSats are becoming more mission focused as technology matures and the development risk decreases.
- The NRO's CubeSat Program Office selects and manifests the CubeSats, and the NRO's Office of Space Launch (OSL) plans, integrates, and executes the mission to deploy the CubeSats that ride to space as auxiliary payloads on NRO launches.

## HISTORY

- California Polytechnic State University (Cal Poly) and Stanford University designed and developed the CubeSat concept in 1999.
- United Launch Alliance (ULA) redesigned the ATLAS V upper stage pressurization system, creating payload volume for the Aft-Bulkhead Carrier (ABC) below the upper stage.
- California Polytechnic State University ("Cal Poly") developed the Poly-Picosatellite Orbital Deployer (P-POD) capable of carrying up to a "3U" CubeSat. The P-POD's are integrated into the Naval Postgraduate School CubeSat Launcher (NPSCuL) and installed on the ATLAS V.
- The Naval Postgraduate School (NPS) developed the NPS CubeSat Launcher (NPSCuL) that carries eight P-POD's. The NPSCuL also provides the hardware to distribute launch vehicle separation signals to deploy the CubeSats.
- The first NRO CubeSat rideshare, OUTSat (Operationally Unique Technologies Satellite), took place in August 2012, onboard NROL-36. GEMSat (Government Experimental Multi-Satellite), was onboard NROL-39 in December 2013. Most recently, ULTRASat (Ultra Lightweight Technology and Research Auxiliary Satellite) carried 10 CubeSats as part of the Air Force mission, AFSPC-5, in May 2015.

